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Review of the paper: Commutator criteria for magnetic pseudodifferential operators

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(Article begins on next page)



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The authors study some commutator techniques in the frame of the twisted pseudodifferential calculus associated to Hamiltonian systems in a bounded, smooth magnetic field. The main goal of the paper is to prove results, analogous to the classic ones, for a generalization of the Weyl calculus adapted to the situation in which a variable magnetic field is also present. In order to take advantage of the gauge invariance the authors formulate the statements about commutators in algebraic frame, using the twisted Moyal algebra.

The main result consists in a generalization of the Beals Criterion [MR0435933 (55 #8884)], in the algebraic setting, which is proved in the case of symbols in the Hörmander class $S_0^0(\mathbf{R}^{2n})$ and $S_\rho^m(\mathbf{R}^{2n})$. A Bony type criterion, see [MR1482829 (98m:35233)], is also proved. Both the criteria are applied to inverses and fractional powers of some twisted pseudo-differential operators. At the end, following the idea of Bony, the authors introduce a class of Twisted Fourier Integral Operators (TFIO) and prove that, for a large class of first order elliptic symbols, the unitary groups they generate (in Hilbert representation) are such TFIO.